Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C

Chapter 2
Data Representation
Exercises

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Question: Number Conversion

- Q: Convert 0x3A56E2F8 into binary

- Q: Convert binary number 111010 into hex

Question: 2's Complement

- For each of the following binary numbers, give the corresponding binary number of the negative of its value, for 2's-complement system
- (a) x=01010101
- (b) x=10101010
- (c) x=10000000

Question: Number Conversion

- Q: What is the decimal value of binary number x=10100111 as either unsigned int, or signed int in 2's complement representation?
- What about x=11100001?
- What about x=10000000?

Question: Number Conversion

- Q: Which number is larger: 1001 or 0011 in binary?
- Q: Which number is larger: 0xFFFFFFFF or 0x00000001 in hex?

Question: Number Range

- Which range of decimals can be expressed with a 6-bit number (assuming Two's complement representation)?

Answer	Range
A	-32 … 32
B	-64 … 63
C	-31 … 32
D	-16 … 15
E	-32 … 31

Question: Number Range

- Which range of decimals can be expressed with a 6-bit unsigned integer?

Answer	Range
A	-32 … 32
B	-64 … 63
C	-31 … 32
D	-16 … 15
E	-32 … 31

Question: Integer arithmetic

- Q: What is the result of 1001 + 0011?

Question: Addition

- Q: Consider a 4-bit system. What is the result of addition 1011+0110, assuming either unsigned integers, or signed integers in 2's-complement representation?

Question: Subtraction

- Q: Q: Consider a 4-bit system. What is the result of subtraction 1011-0110, assuming either unsigned integers, or signed integers in 2's-complement representation?

Question: Subtraction

- Q: Consider a 4-bit system. What is the result of subtraction 0110-1011, assuming either unsigned integers, or signed integers in 2's-complement representation?

Question: True or False

- 1. Overflow is impossible when subtracting one unsigned number from another.
- 2. Overflow is impossible when subtracting two signed operands of the same sign.
- 3. There are two representations of zero in 2's complement representation.
- 4. In 2's complement, the absolute values of full-scale negative and full-scale positive are identical